CLAIMS

What is claimed is:

1   1.   A method comprising:

2   determining a state of a variable corresponding to a semaphore;

3   generating a semaphore entry for a thread of instructions prior to dispatch of the

4   thread for execution if the variable is in a first state; and

5   dispatching the thread of instructions for execution prior to generating the

6   semaphore entry for the thread if the variable is in a second state.

1   2.   The method of claim 1 further comprising dispatching the thread of

2   instructions for execution and during the thread execution generating a semaphore entry

3   for the thread if the variable is in a third state.

1   3.   The method of claim 1 wherein the variable corresponding to the

2   semaphore indicates whether a semaphore entity is to automatically transmit a message

3   indicating control of the semaphore to execution circuitry corresponding to the thread of

4   instructions.

1   4.   The method of claim 1 wherein generating the semaphore entry for the

2   thread of instructions prior to dispatch of the thread of instructions if the variable is in the

3   first state comprises:

4   transmitting a message to a semaphore entity to request control of the semaphore

5   by the thread of instructions; and

6   dispatching the thread of instructions to execution circuitry in response to

7   receiving a signal indicating that the semaphore entity has processed the message.

1   5.   The method of claim 4 wherein the transmitting the message to the

2   semaphore entity and dispatching the thread of instructions are pipelined.

1   6.   The method of claim 4 wherein the message comprises a semaphore

2   identifier field, a thread identifier field, and a field corresponding to the variable.

1   7.   The method of claim 1 wherein dispatching the thread of instructions for

2   execution prior to generating the semaphore entry for the thread if the variable is in a

3   second state comprises:

4   dispatching the thread of instructions to execution circuitry; and

5   transmitting a message to a semaphore entity to request control of the semaphore

6   by the thread of instructions in response to a signal indicating that execution of the thread

7   of instructions has commenced.

1   8.   The method of claim 7 wherein the dispatching of the thread of

2   instructions and transmitting of the message to the semaphore entity are pipelined.

1 9. The method of claim 7 wherein the message comprises a semaphore

2 identifier field, a thread identifier field, and a field corresponding to the variable.

1 10. The method of claim 2 wherein dispatching the thread of instructions for

2 execution and during the thread execution generating the semaphore entry for the thread

3 if the variable is in a third state comprises:

4 dispatching the thread of instructions to execution circuitry; and

5 transmitting a message to a semaphore entity to request control of the semaphore

6 by the thread of instructions in response to the execution of a set of instructions.

1 11. The method of claim 10 wherein the set of instructions comprises an

2 acquire semaphore instruction.

1 12. The method of claim 10 wherein the set of instructions comprises an

2 acquire semaphore with auto-release instruction.

1 13. An apparatus comprising:

2 means for determining a state of a variable corresponding to a semaphore;

3 means for generating a semaphore entry for a thread of instructions prior to

4 dispatch of the thread for execution if the variable is in a first state; and

5 means for dispatching the thread of instructions for execution prior to generating

6 the semaphore entry for the thread if the variable is in a second state; and

7   dispatching the thread of instructions for execution and during the thread

8   execution generating a semaphore entry for the thread if the variable is in a third state.

1   14.   The apparatus of claim 13 further comprising means for dispatching the

2   thread of instructions for execution and during the thread execution generating a

3   semaphore entry for the thread if the variable is in a third state.

1   15.   The apparatus of claim 13 wherein the means for generating the

2   semaphore entry for the thread of instructions prior to dispatch of the thread of

3   instructions if the variable is in the first state further comprises:

4   means for transmitting a message to a semaphore entity to request control of the

5   semaphore by the thread of instructions; and

6   means for dispatching the thread of instructions to execution circuitry in response

7   to receiving a signal indicating that the semaphore entity has processed the message.

1   16. .   The apparatus of claim 13 wherein the means for dispatching the thread of

2   instructions for execution prior to generating the semaphore entry for the thread if the

3   variable is in a second state further comprises:

4   means for dispatching the thread of instructions to execution circuitry; and

5   means for transmitting a message to a semaphore entity to request control of the

6   semaphore by the thread of instructions in response to a signal indicating that execution

7   of the thread of instructions has commenced.

1   17.   The apparatus of claim 14 wherein the means for dispatching the thread of

2   instructions for execution and during the thread execution generating the semaphore entry

3   for the thread if the variable is in a third state comprises:

4   means for dispatching the thread of instructions to execution circuitry; and

5   means for transmitting a message to a semaphore entity to request control of the

6   semaphore by the thread of instructions in response to the execution of a set of

7   instructions.

1   18.   An apparatus comprising:

2   a semaphore entity to maintain entries for a semaphore indicating one or more

3   threads of instructions requesting control of the semaphore;

4   execution circuitry to execute one or more threads of instructions; and

5   a thread dispatcher coupled with the semaphore entity and the execution circuitry,

6   the thread dispatcher to determine a state of a variable corresponding to the semaphore,

7   generate a message to the semaphore entity to cause a semaphore entry for a thread of

8   instructions to be generated prior to dispatch of the thread of instructions to the execution

9   circuitry for execution if the variable is in a first state, and dispatch the thread of

10   instructions to the execution circuitry for execution prior to generating a message to the

11   semaphore entity to cause the semaphore entry for the thread to be generated if the

12   variable is in a second state.

1 19. The apparatus of claim 18 wherein the thread dispatcher further dispatches

2 the thread of instructions for execution and without generating a semaphore entry for the

3 thread if the variable is in a third state.

1 20. The apparatus of claim 18 wherein the semaphore entity maintains one or

2 more semaphores.

1 21. The apparatus of claim 18 wherein the message comprises a semaphore

2 identifier field, a thread identifier field, and a field corresponding to the variable.

1 22. The apparatus of claim 18 wherein the variable corresponding to the

2 semaphore indicates whether a semaphore entity is to automatically transmit a message

3 indicating control of the semaphore to execution circuitry corresponding to the thread of

4 instructions.

1 23. The apparatus of claim 18 wherein generating a message to the semaphore

2 entity to cause a semaphore entry for a thread of instructions to be generated prior to

3 dispatch of the thread of instructions to the execution circuitry for execution if the

4 variable is in a first state comprises transmitting a message to a semaphore entity to

5 request control of the semaphore by the thread of instructions, and dispatching the thread

6 of instructions to the execution circuitry in response to receiving a signal indicating that

7 the semaphore entity has processed the message.

1   24.   The apparatus of claim 23 wherein the operations of transmitting the

2   message to the semaphore entity and dispatching the thread of instructions are pipelined.

1   25.   The apparatus of claim 18 wherein dispatching the thread of instructions

2   to the execution circuitry for execution prior to generating a message to the semaphore

3   entity to cause the semaphore entry for the thread to be generated if the variable is in a

4   second state comprises dispatching the thread of instructions to execution circuitry, and

5   transmitting a message to a semaphore entity to request control of the semaphore by the

6   thread of instructions in response to a signal indicating that execution of the thread of

7   instructions has commenced.

1   26.   The apparatus of claim 25 wherein the operations of transmitting the

2   message to the semaphore entity and dispatching the thread of instructions are pipelined.

1   27.   The apparatus of claim 19 wherein the execution circuitry generates a

2   message to a semaphore entity to request control of the semaphore by the thread of

3   instructions in response to the execution of a set of instructions.

1   28.   A system comprising:

2   a memory controller;

3   a semaphore entity to maintain entries for a semaphore indicating one or more

4   threads of instructions requesting control of the semaphore;

5   execution circuitry to execute one or more threads of instructions; and

6   a thread dispatcher coupled with the semaphore entity, the execution circuitry and

7   the memory controller to determine a state of a variable corresponding to the semaphore,

8   generate a message to the semaphore entity to cause a semaphore entry for a thread of

9   instructions to be generated prior to dispatch of the thread of instructions to the execution

10   circuitry for execution if the variable is in a first state, dispatch the thread of instructions

11   to the execution circuitry for execution prior to generating a message to the semaphore

12   entity to cause the semaphore entry for the thread to be generated if the variable is in a

13   second state, and dispatch the thread of instructions for execution and without generating

14   a semaphore entry for the thread if the variable is in a third state.

1   29.   The system of claim 28 wherein the thread dispatcher further dispatches

2   the thread of instructions for execution and without generating a semaphore entry for the

3   thread if the variable is in a third state.

1   30.   The system of claim 28 wherein the message comprises a semaphore

2   identifier field, a thread identifier field, and a field corresponding to the variable.

1   31.   The system of claim 28 wherein the variable corresponding to the

2   semaphore indicates whether a semaphore entity is to automatically transmit a message

3   indicating control of the semaphore to execution circuitry corresponding to the thread of

4   instructions.

1   32.   The system of claim 28 wherein generating a message to the semaphore

2   entity to cause a semaphore entry for a thread of instructions to be generated prior to

3   dispatch of the thread of instructions to the execution circuitry for execution if the

4   variable is in a first state comprises transmitting a message to a semaphore entity to

5   request control of the semaphore by the thread of instructions, and dispatching the thread

6   of instructions to the execution circuitry in response to receiving a signal indicating that

7   the semaphore entity has processed the message.

1   33.   The system of claim 28 wherein dispatching the thread of instructions to

2   the execution circuitry for execution prior to generating a message to the semaphore

3   entity to cause the semaphore entry for the thread to be generated if the variable is in a

4   second state comprises dispatching the thread of instructions to execution circuitry, and

5   transmitting a message to a semaphore entity to request control of the semaphore by the

6   thread of instructions in response to a signal indicating that execution of the thread of

7   instructions has commenced.

1   34.   The system of claim 28 wherein the operations of transmitting the

2   message to the semaphore entity and dispatching the thread of instructions are pipelined.